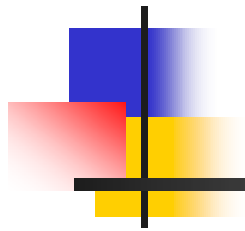


中樞神經與心智功能

Central Nervous System and Mentality



葉炳強
輔大醫學院
耕莘神經醫學中心



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心智是什麼？

n 心智、心神、神智、智力、智能

智慧、認知、精神

n 腦子如何思想 (think) ?

如何行為 (behaves) ?

如何表達情感 (express emotion)?



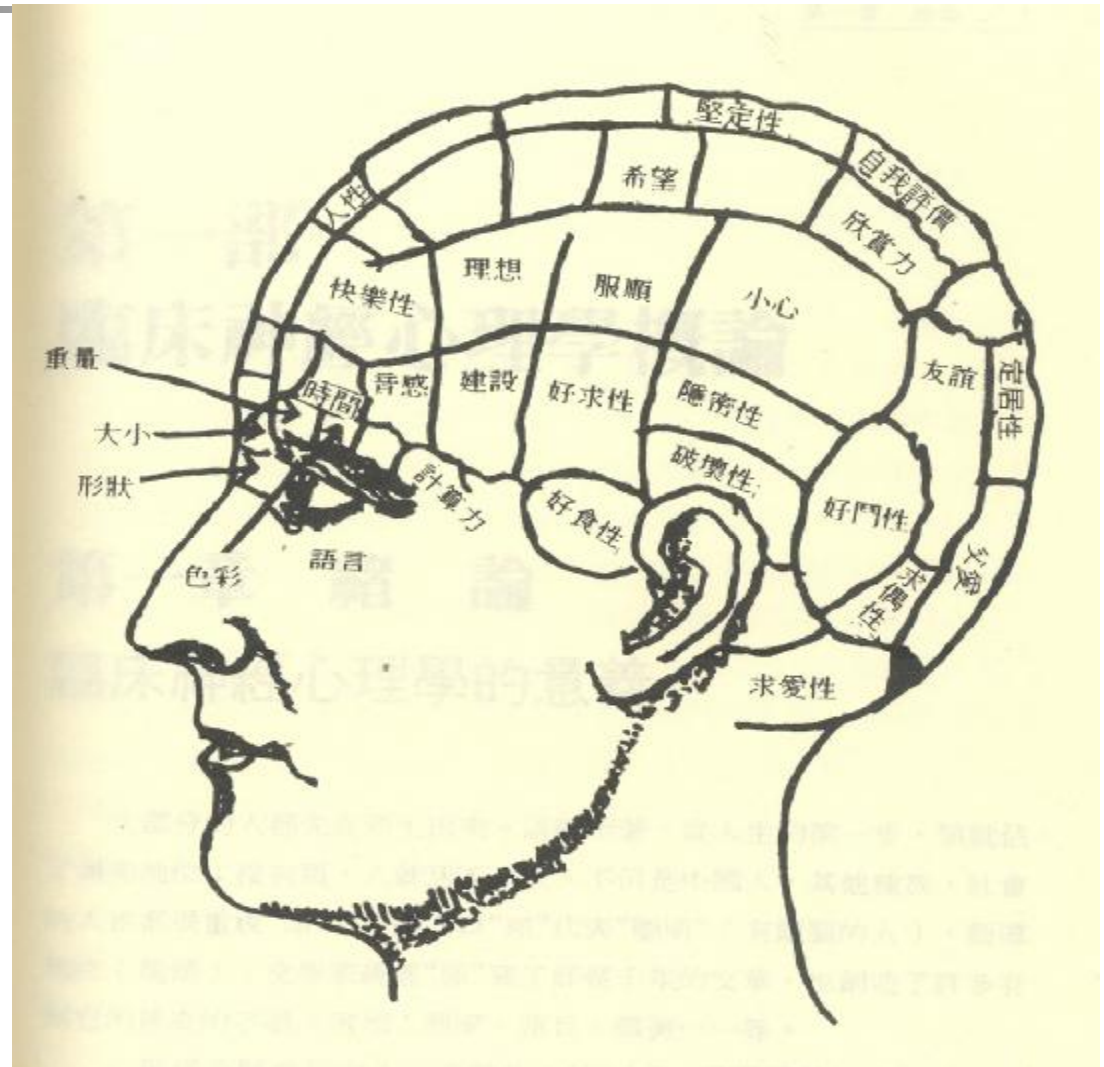
腦子如何運作的歷史演變

- n 心→腦
- n 腦子一元論
- n 腦子單獨分區論
- n 腦子整合功能論



Gall & Spurzheim, 1830

n 腦相學
(Phrenology)的假設
是心理功能與大腦
有關連



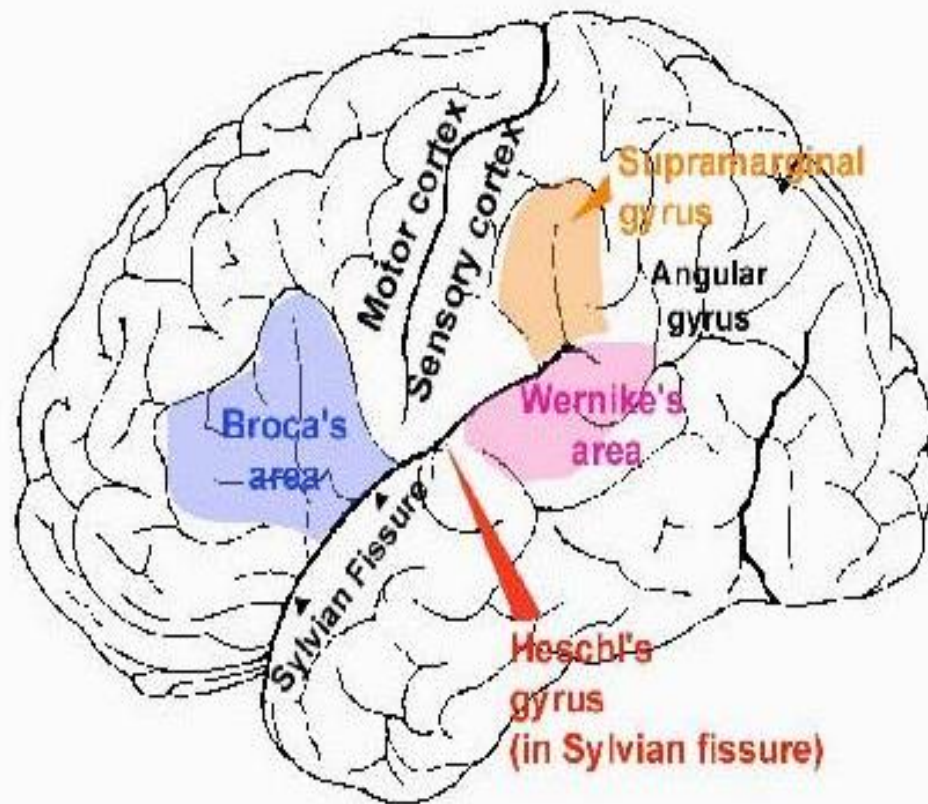


現代科學如何了解腦功能

- n 死後解剖與症狀配合 (Thomas Willis, Paul Broca)
- n 外科手術與神經電生理 (Wilder Penfield, 1930+)
- n 神經心理評估 (1940+)
- n 結構性神經影像 (CT, 1970 ; MRI, 1980)
- n 功能性神經影像 (PET, 1970 ; fMRI, 1990)
- n 整合性神經與認知影像

Paul Broca 1861,

語言運動區

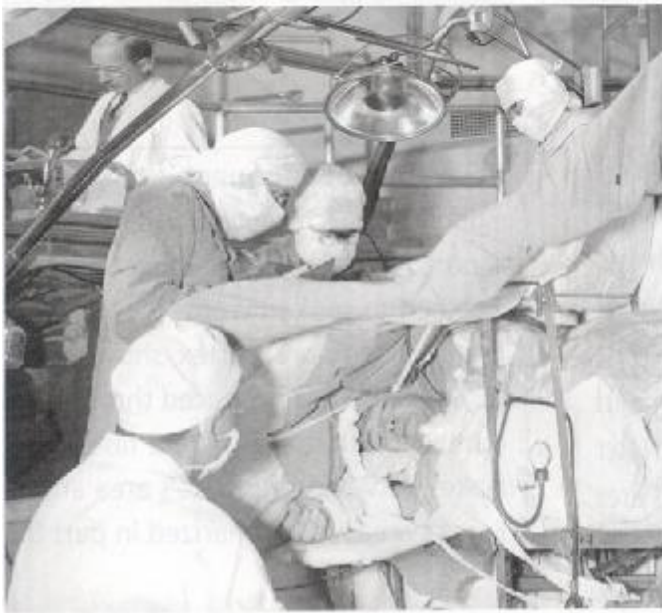




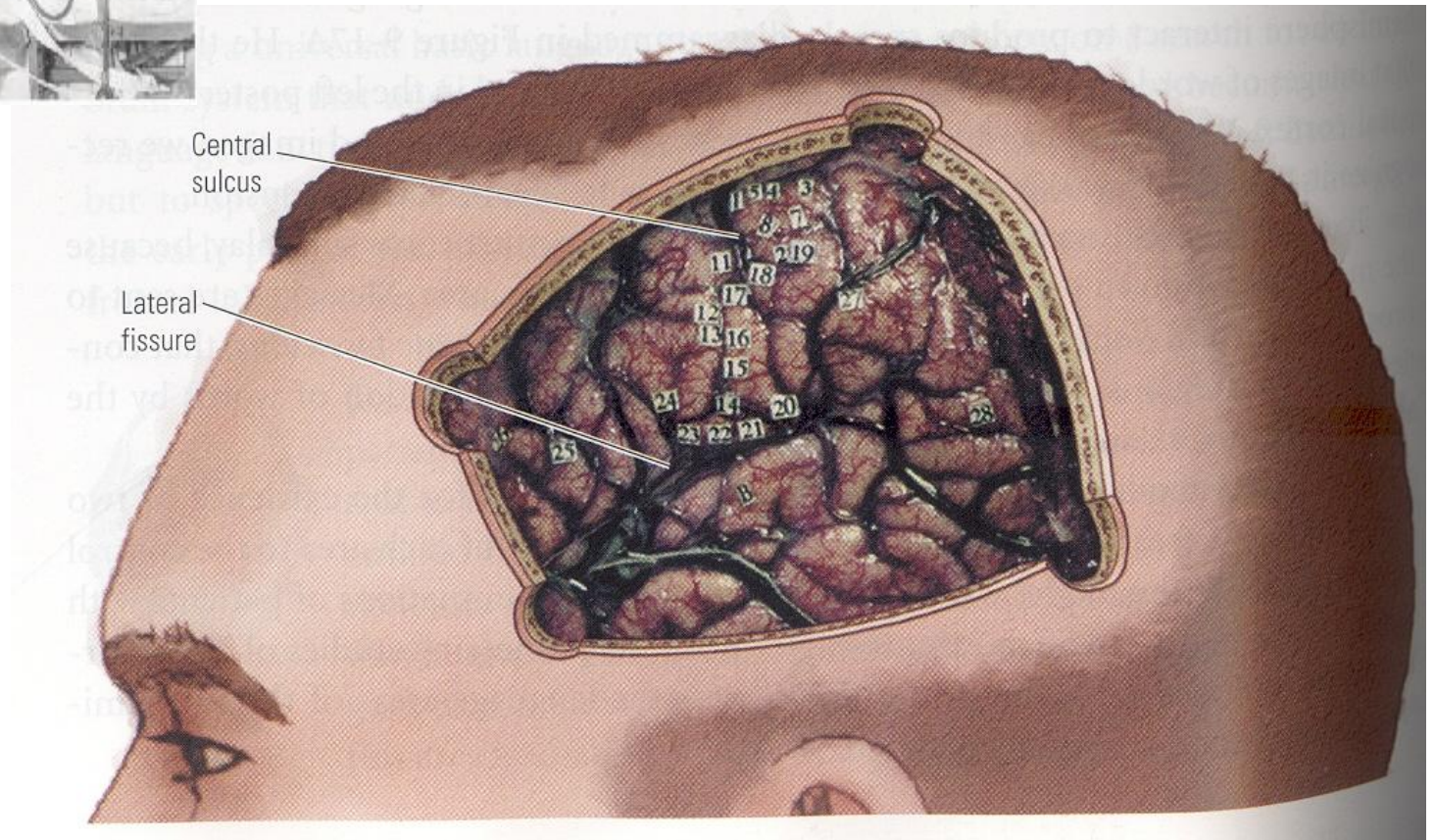
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+



Prof. Wilder Penfield (1891-1976)





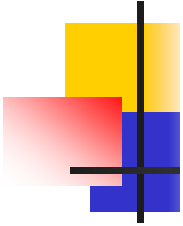
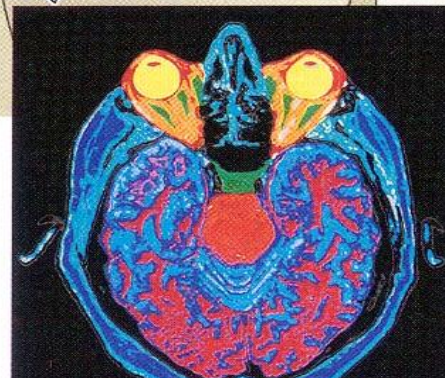
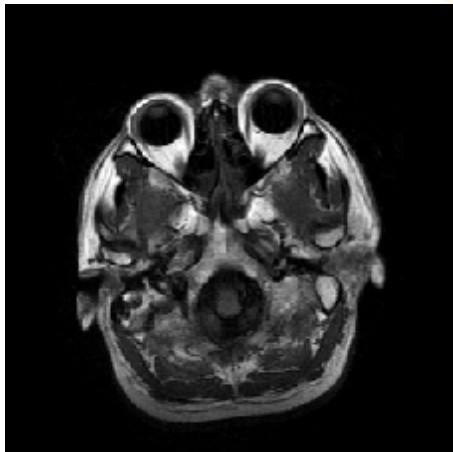
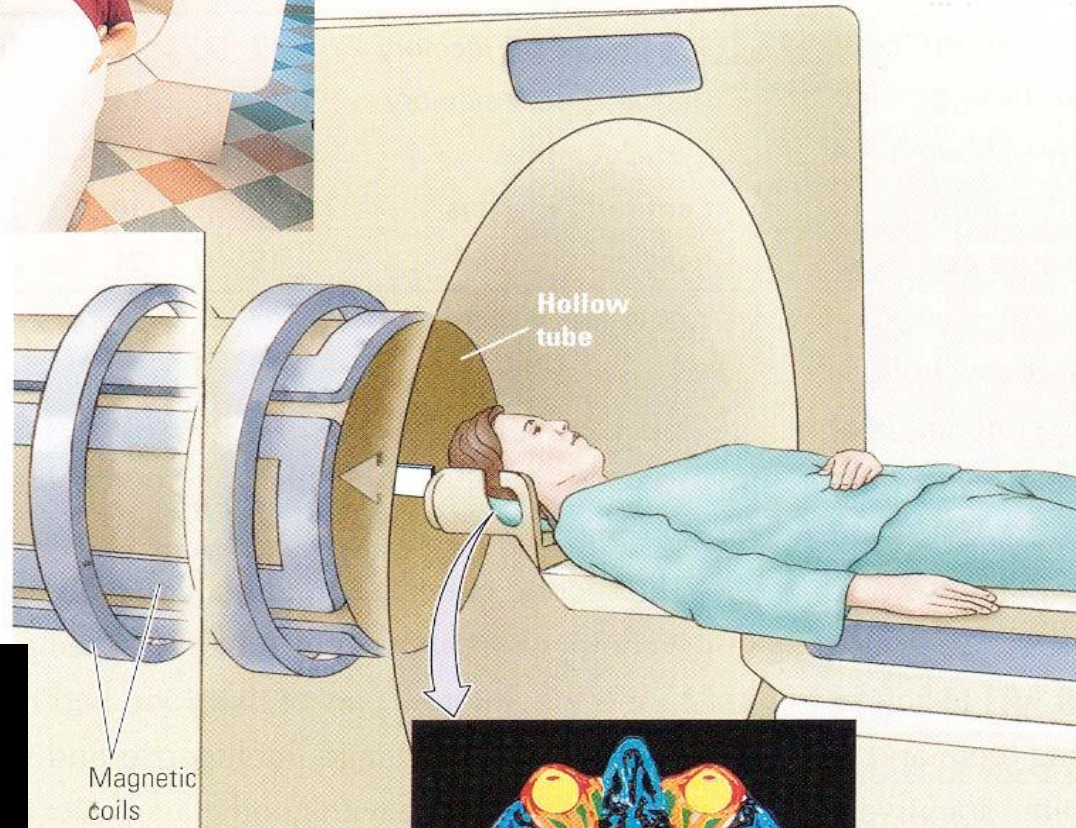
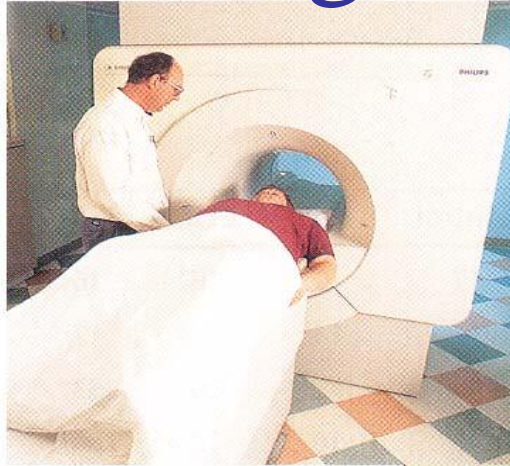
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+

Magnetic Resonance Imaging

核磁共振



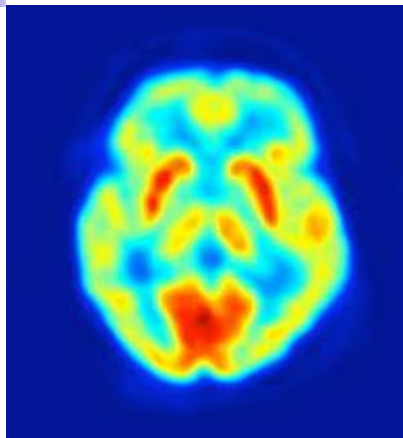


現代科學如何了解腦功能

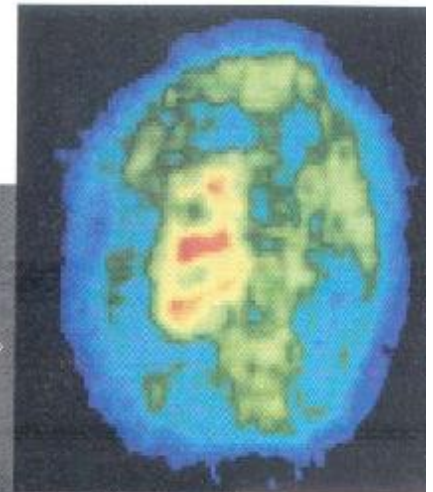
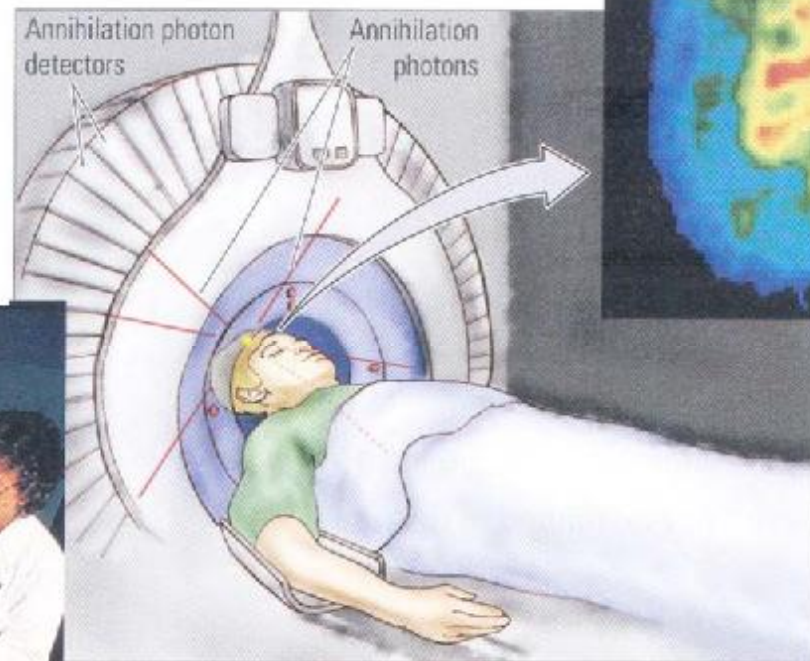
- n 死後解剖與症狀配合(Thomas Willis, Paul Broca)
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- n 整合性神經與認知影像

Positron Emission Tomography

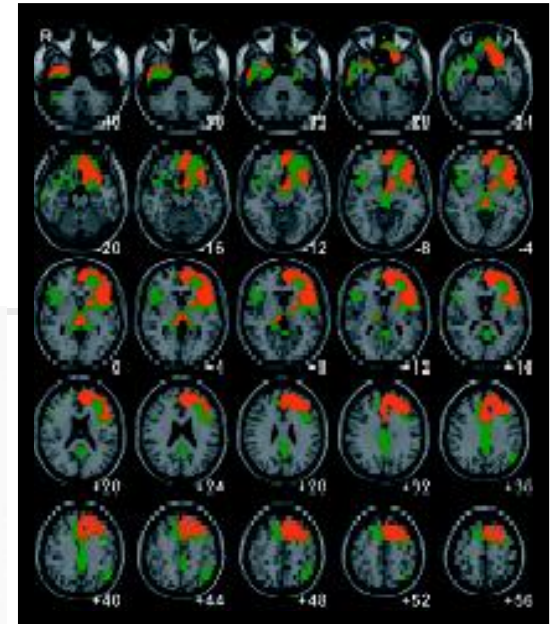
正子造影 (1976)



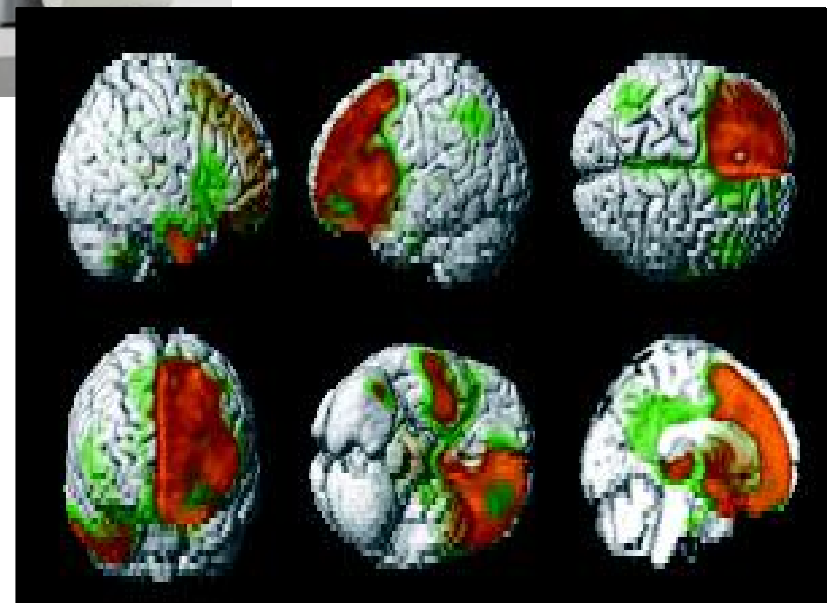
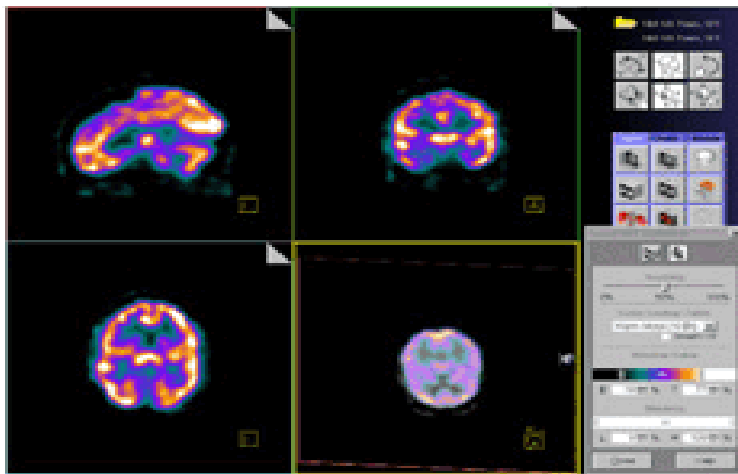
A small amount of radioactively labeled water is injected into a subject. Active areas of the brain use more blood and thus have more radioactive labels.



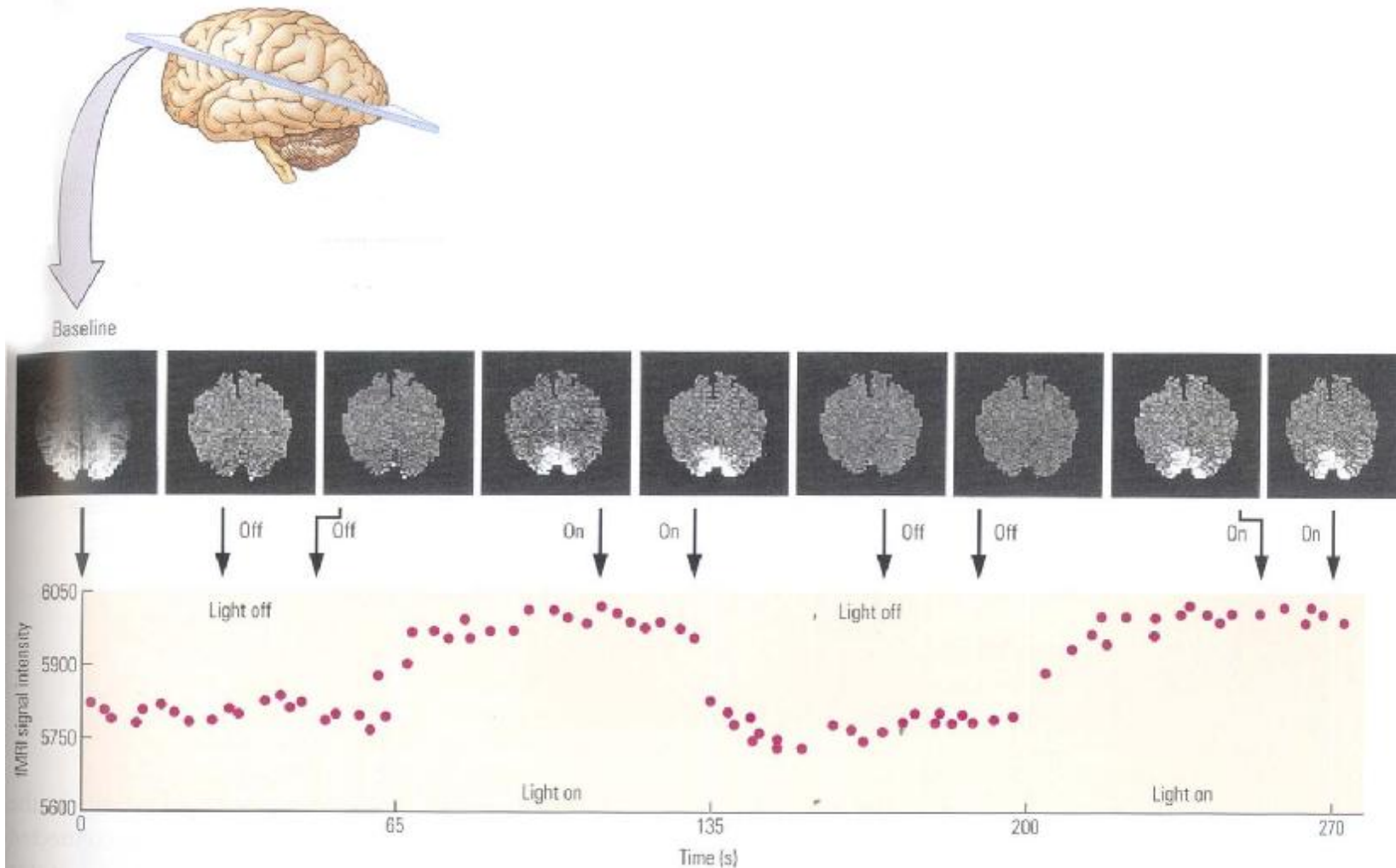
Positrons from the radioactivity are released; they collide with electrons in the brain, and photons (a form of energy) are produced, exit the head, and are detected.



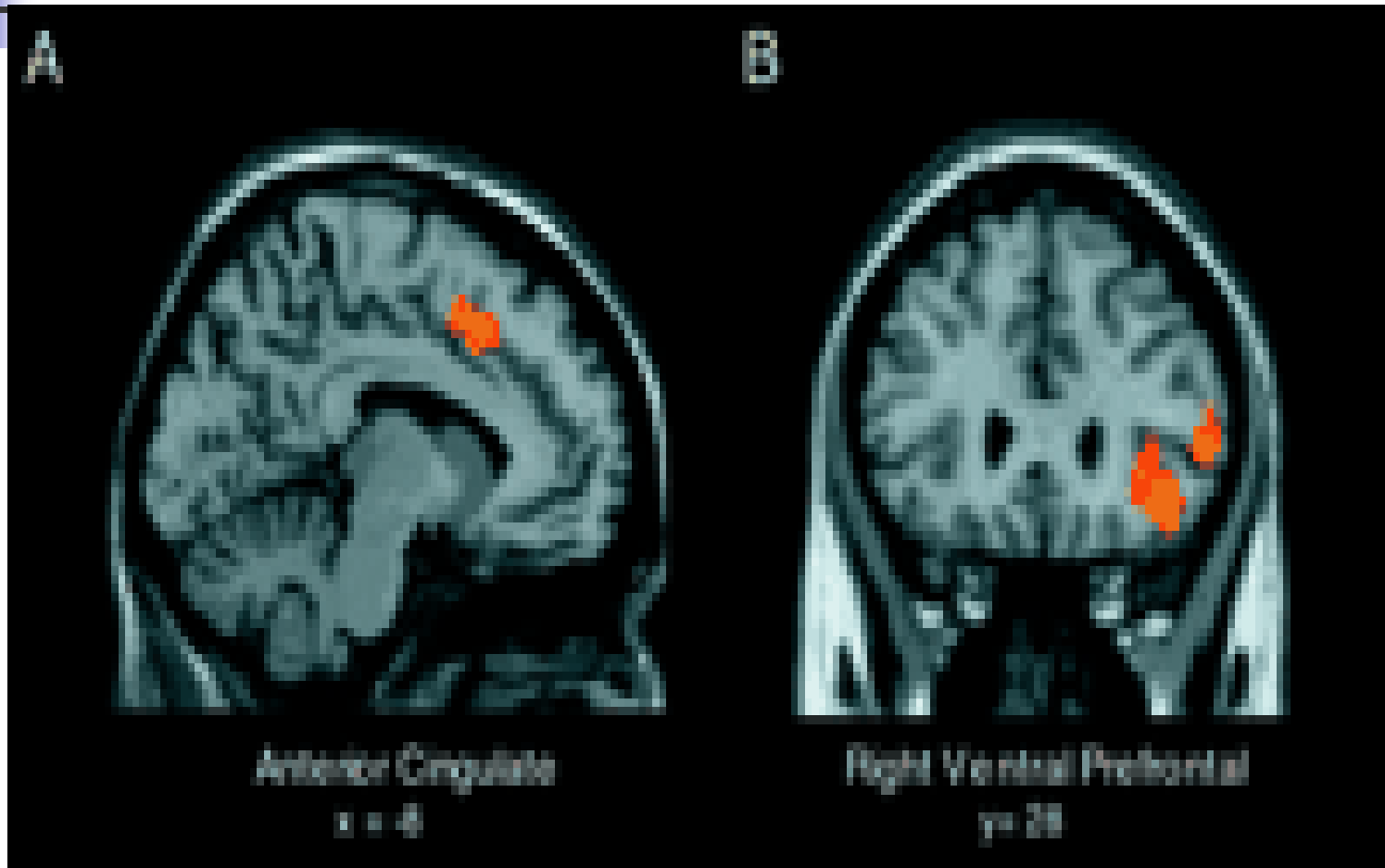
Neurology Engine SPECT-CT



功能性核磁共振 (fMRI) 看到腦部活動



失落悲痛時腦子那裡在活動？



Eisenberger N et al , Science 2003



心智是什麼？

- n Cognition and intelligence 認知與智慧
- n Behavior and Psychology 行為與心理
- n Affect , mood and emotion 情緒、情感

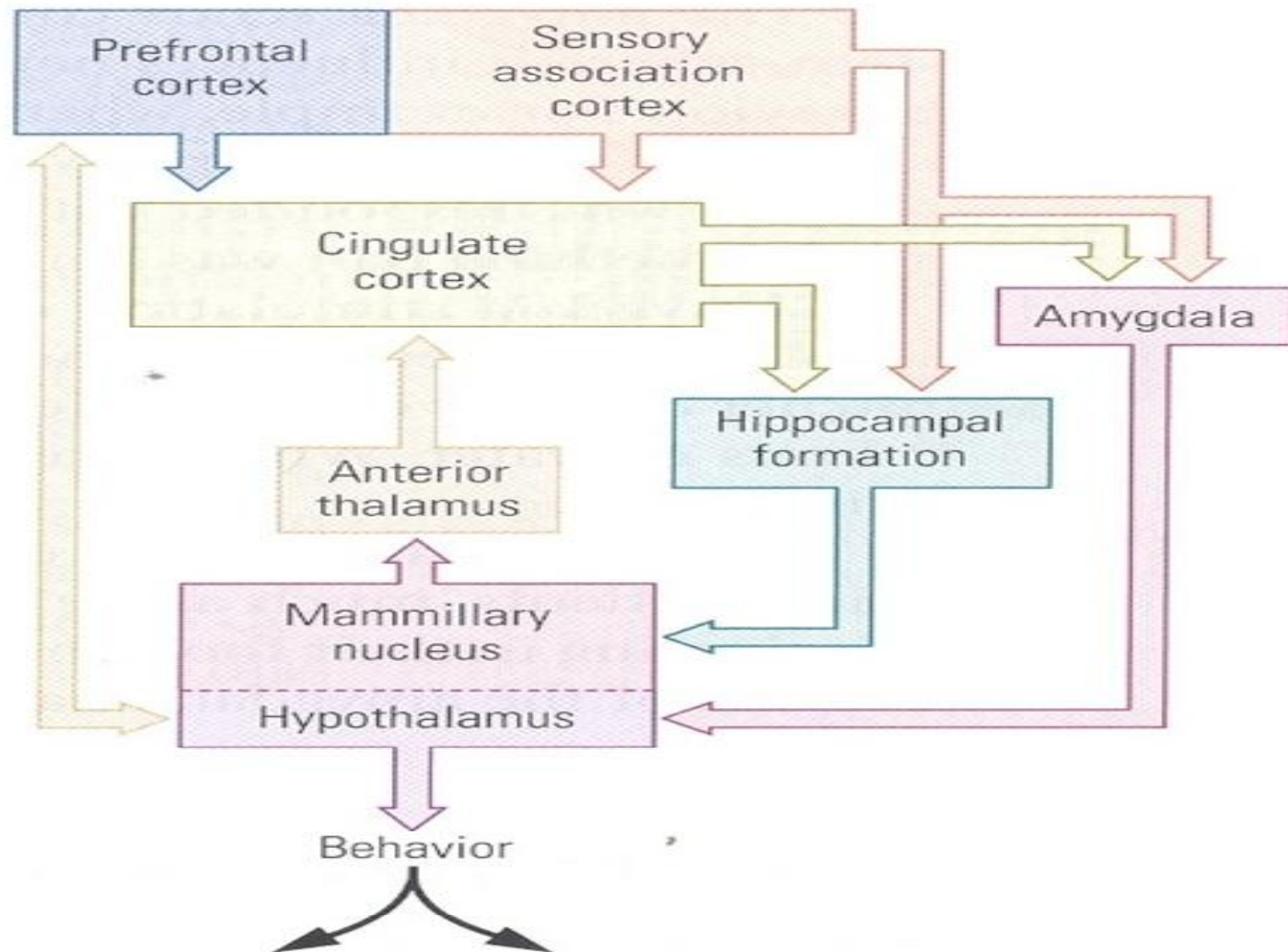
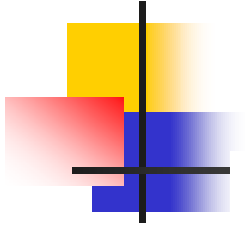


認知功能

1. 注意力
2. 記憶力
3. 語言能力
4. 視覺辨認、空間位置
5. 運用能力
6. 執行能力（管理控制）

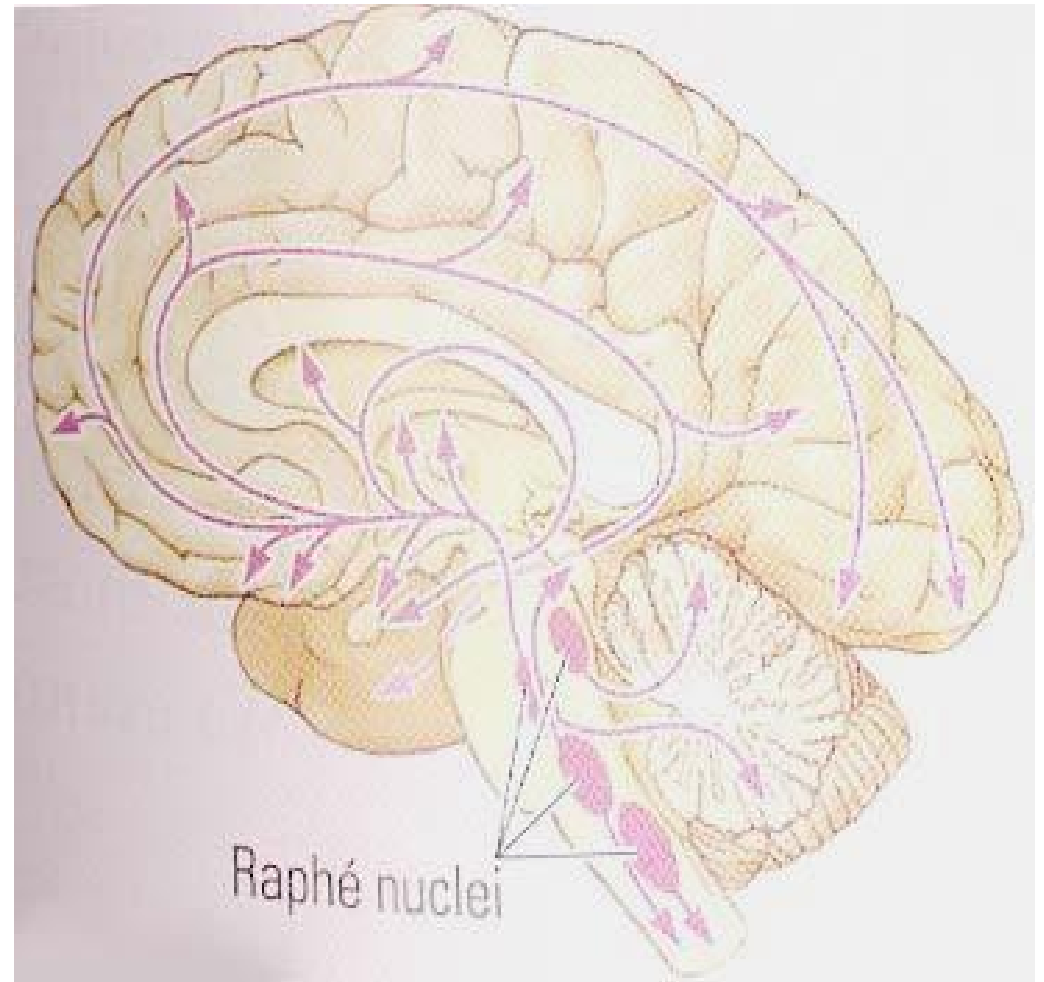


邊緣系統的運作 (Limbic System)



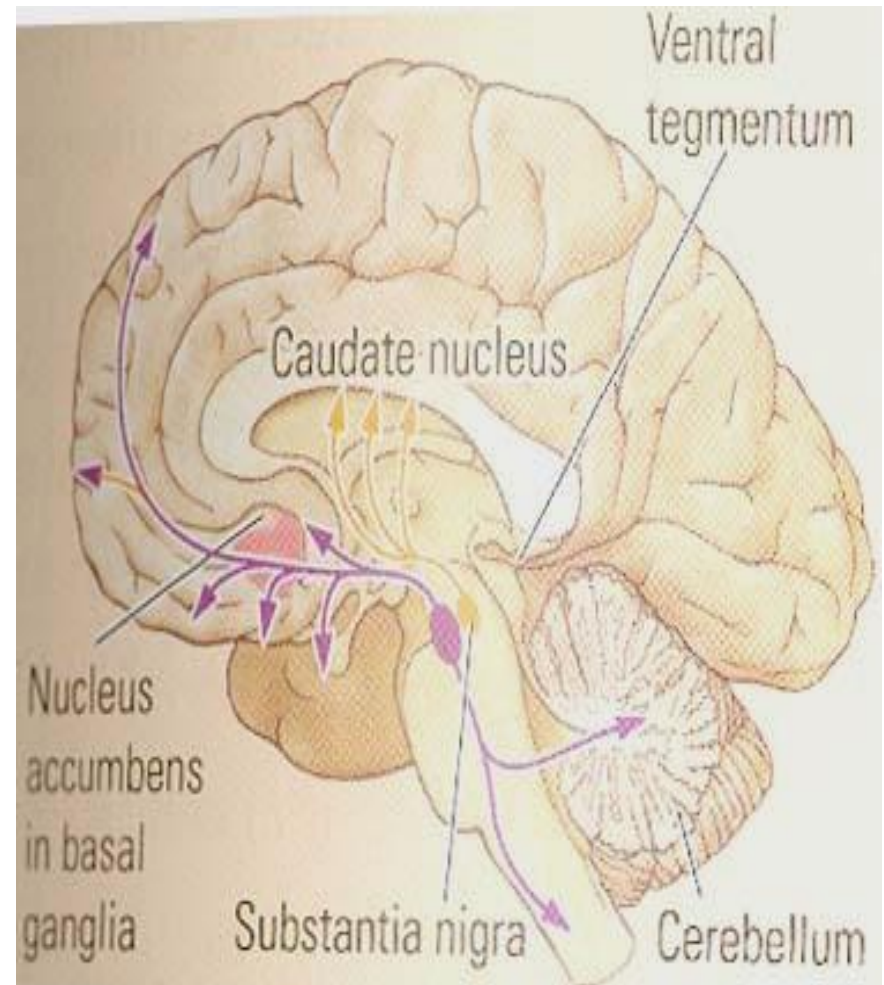
血清張力素系統 (Serotonergic System)

- n 維持清醒狀態
- n 與行為控制有關
- n 與食慾、體溫有關
- n 與情緒有關
- n 與靈性度有關
- n 與憂鬱症有關

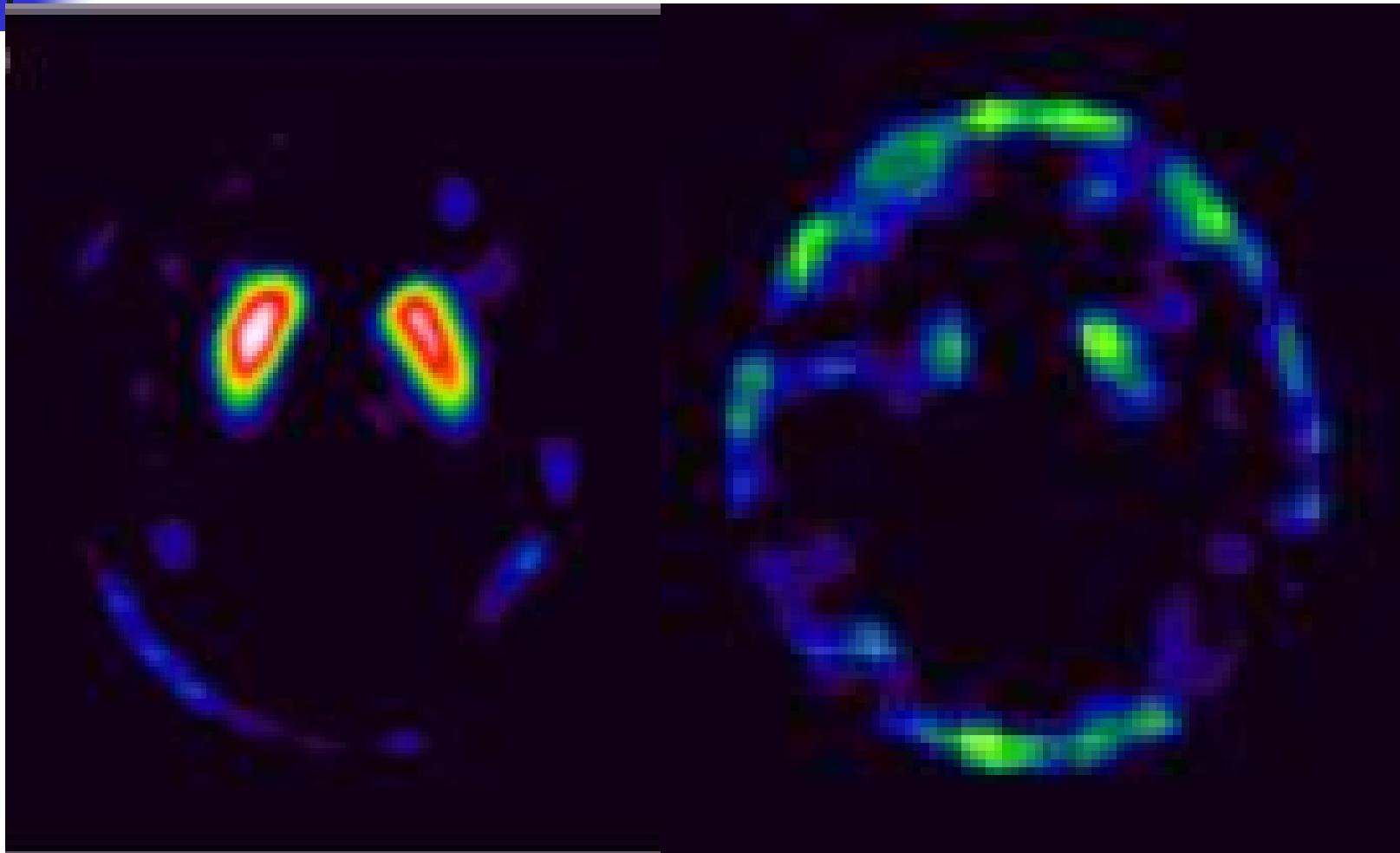


多巴胺系統 (Dopaminergic System)

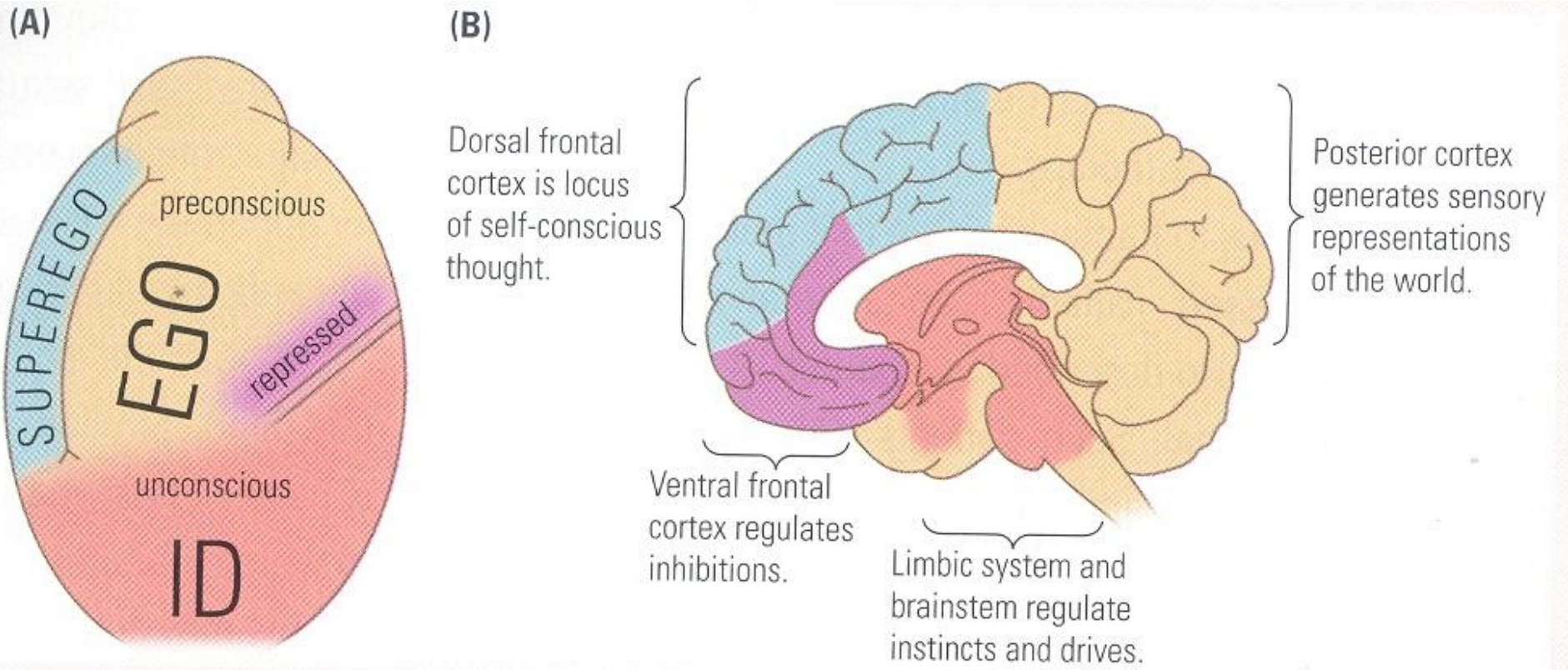
- n 維持正常的運動功能
- n 與巴金森氏症有關
- n 與快樂及回饋的感覺有關
- n 與藥物成癮有關
- n 與精神分裂症有關



神經傳導物質(多巴胺) 的腦影像



弗洛伊德的心智模式



快樂的腦神經位置

前額葉

PFC

NAc

VTA

A

H

邊緣系統

阿肯伯氏核,

Nuclues accumbens

PFC

Glutamate

NAc

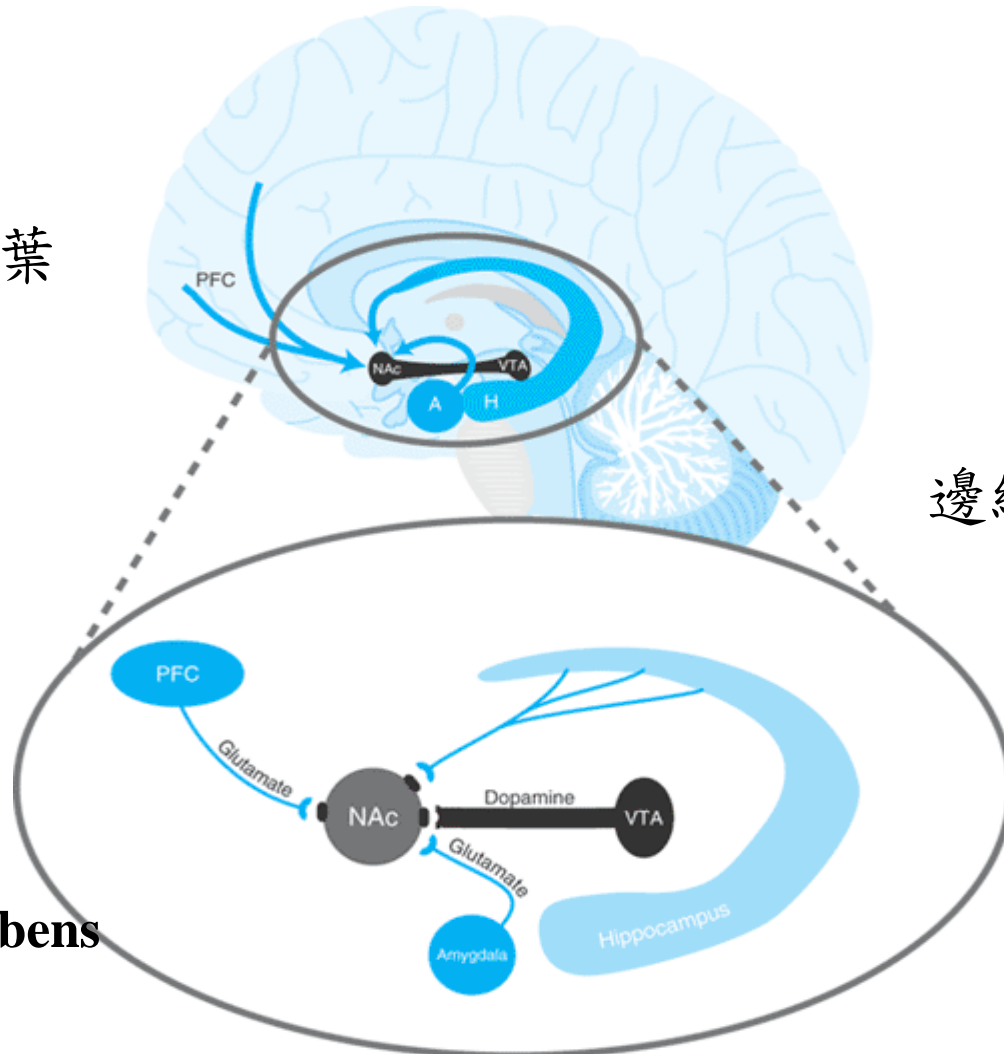
Glutamate

Amygdala

Dopamine

VTA

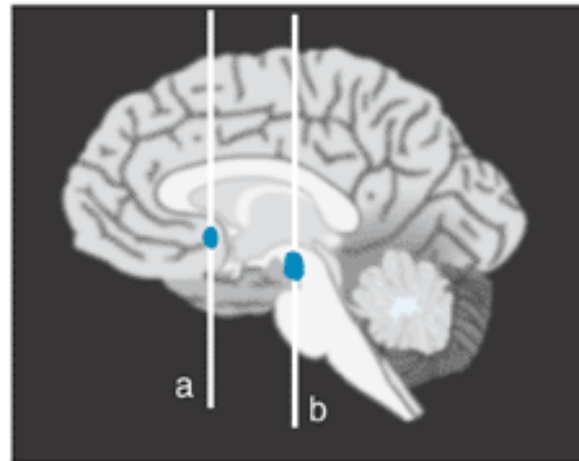
Hippocampus



快樂的感覺

Drugs

1. Cocaine
2. Alcohol
3. Amphetamines
4. Methylphenidate
5. Nicotine



Feelings

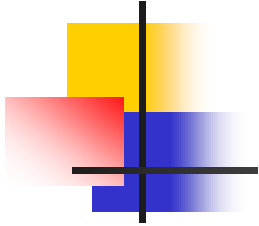
6. Romantic love
7. Listening to music
8. Humor
9. Expectation of \$\$\$
10. Inflicting punishment
11. Looking at beautiful faces
12. Social co-operation
13. Eating chocolate

a. Nucleus accumbens



b. Ventral tegmental area

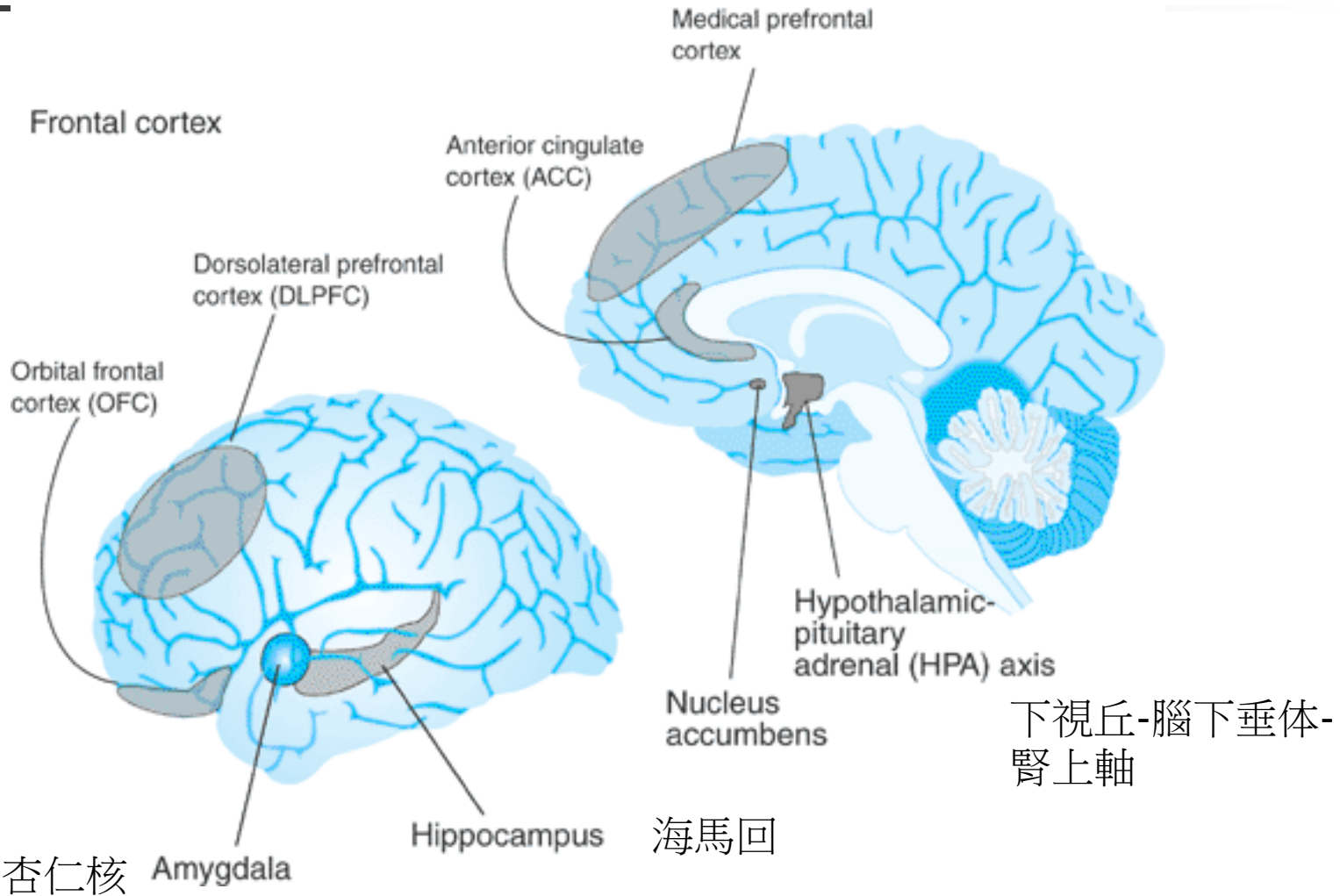




憂鬱時腦子那裡最Blue?

額葉

Frontal cortex





信仰的表達與內涵

n 平安、喜樂

n 信、望、愛



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信仰的心智模式？

- n Cognition (認知) 信、望、愛
- n Behavior (行為) 愛
- n Affect (情緒) 平安、喜樂、愛

